TMF

March 1990

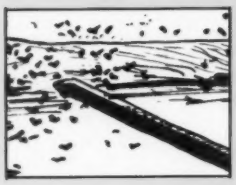
THE MAC FLYER - For Greater Safety in MAC Air Operations

The Theater Airlift Story. . .page 16

TMF

THE MAC FLYER—For Greater Safety in MAC Air Operations

March 1990 MACSP 127-5 VOL XXXVII NO. 3



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ATTENTION PROCRASTINATORS! THE DEADLINE IS NEAR . . . .

Attention all you procrastinators . . . The stroke of midnight on 31 March 1990 will terminate this year's MAC Flight Safety Writing Contest.

For the last five months we've been trying to coax you into entering the 1990 Contest. We've appealed to your ego and professionalism; bribed you with visions of desk sets and plaques; promised you a complimentary one-year subscription to *TMF*; in short, we've appealed to general high and low motivators. Enough already . . . We'll try, one more time, to encourage you to enter by giving away trade secrets—**HOW TO BECOME A CONTEST WINNER! ! ! !**

—The contest is judged by *TMF* editors, one or more from the Flight Safety Division, the Deputy Director of Safety and Director of Safety. Selections are reviewed and approved by the Deputy Inspector General and Inspector General. Here are the categories judges use to rate entries:

—Flight safety message.

—Reader interest.

—Originality and quality approach.

—Quality of writing.

—Overall impact.

—Entries are judged on their merits alone and the names of the authors are not known until final selection is made.

So now you know who judges the contest and in general, what they look for. The only thing left for you to do is hurry and mail your entry, postmarked NLT 31 March 1990. Follow the rules below.

THE RULES

The 1990 MAC Flight Safety Writing Contest is conducted according to MACR 900-3 and these rules. Entries must be original, unpublished, contain an aviation safety/mishap prevention message, and be postmarked no later than 31 March 1990. Stories must be between approximately 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages). Poetry should average 75 to 100 lines. Manuscripts must be typed, double-spaced, and submitted in two copies. Identify entries by title only and attach a cover sheet indicating author's name, address, duty phone, unit and home address. Please include a brief biography.

The contest is open to all. Entries qualifying under the above rules earn their author a complimentary one-year subscription to *TMF*. However, desk sets and plaques may be awarded only to military members and civilian employees of the Department of the Air Force and Air Reserve Components. Other entries may be selected for Honorable Mention, Special Category.

Winning entries will be published in *TMF*. Submit to:

MAC Flight Safety Writing Contest, 1990
HQ MAC/IGFE
Scott AFB, Illinois 62225-5101

JUST ANOTHER LOW-LEVEL

By TSgt. James W. McClain
1275 TEF, Edwards AFB, Calif.

It feels just like another typical Northwest Florida summer evening, as I pull into the squadron parking lot. I see the heat lightning in the distance and smell the tang of salt in the air. The dull rumble of the power carts, as maintenance begins preflights, can be heard from the flightline.

As we walk out of life support, one of the other guys on the crew, another long time special operator, confirms my suspicion that it looks like another typical Monday night flight.

Yep, just another low-level training mission, we all think as we settle into our seats for the crew briefing.

Four hours of terrain following at 250-500 feet AGL in the mountains, at night, followed by an hour's worth of airdrop (a multiple High Speed Low Level Aerial Delivery System) and a Container Release System with an hour of pilot pro (blacked out landings) to round off just another routine training mission. (Only one student pilot and one student navigator tonight.)

I run over the mission profile in my mind; a couple of SAM sites with an AI near where the fence check should be, with three or four mobile SPETZNAZ AAA units

1989 MAC FLIGHT SAFETY WRITING CONTEST
HONORABLE MENTION

MISSION

sprinkled along the route for good measure. I wonder if everyone is up on their threat call coordination. Should be no problem.

Nothing unusual in the weather briefing for this time of year. There was something mentioned briefly during last week's flight safety meeting that I can't quite remember. It was on one of those endless briefing slides safety is so fond of. I would have paid more attention had it not turned into one of the usual meetings.

Two hours into the low-level route with nothing unusual. Everyone's up on their crew coordination tonight. I thought it was pretty good on the simulated drop when the nav called "Green light!," the EWO yelled "SAM—Two o'clock!," the load screamed "Fouled paratrooper!," the student pilot shouted "Accelerate and climb!" and the student nav cleared us to "Break Left!" into the mountain top. We all just grinned and kept pressing on.

It should be getting near the end of the low-level route soon. Yep, there's the boundary of the wildlife refuge coming up. Even the loads know the major turnpoints after flying this same route time after time. The moon sure does make it easy to pick out landmarks—not to mention us.

This part of the route has always been a favorite. I think back to the times I've come out here with my family on camping trips and found the choice spots for fishing, thanks to all the aerial recons provided free of charge. I remember the balmy summer evenings spent around the campfire telling ghost stories to the kids, and the times spent watching the sun go down over the lake while flocks of birds wing their way to nests on the isolated little island in the middle of the lake. Thinking about the graceful formations of birds, and following their paths across the sky, reminds me what the slide at the safety meeting was about. The slide described periods of bird activity.

All thoughts are interrupted as we look out and see a little bit of the lake coming into view, and the little island in the center of it. What are those shapes coming up in the windows? "Holy . . . . ! " someone yells, "Birdstrike!" One of the loads is calling "Tailpipe fire on Number 3 engine." The flight engineer is punching the IP on the shoulder and pointing to the gauges for Number 3. The student pilot is staring at the window pane

directly in front of him, the window pane with the bulge facing in.

Can't tell how much damage there is to to the rest of the plane. The whole right side took hits. The navigator thought he could see at least two good size holes in the leading edge, with the rest of it pretty heavily battered. The flight engineer pointed out the thumping noise coming from the radome/sky anchor area. No telling what's causing that. Could be the radome is ready to come apart. We're climbing and slowing down and the engine shutdown checklist is cleaned up. The navs are plotting the quickest route home, while the radio operator informs "Mother" of our problems. The EWO is double-checking everyone and making sure we aren't forgetting any critical items while the loads are securing the cargo compartment and scanning for any other damage. The student pilot is generally keeping things flying while keeping an eye peeled on the window pane.

The runway environment is coming into view. Everyone's still pretty hyped up, but the small amount of casual interphone chatter let's us know everyone believes it'll be just another three-engine landing.

There's touchdown and roll out. All those pretty lights from the emergency vehicles go flashing by. Let her roll out to the end of the runway and off onto the taxiway. No need to make an egress. Just calmly and slowly unstrap and let things catch up.

Standing on the ramp, we carefully look the airplane over. In the harsh glare of the lightstand and ramp lights, I whistle softly as I look at the mangled remains of the right leading edge. There are three fist-sized holes with more dents than we can count. The odor of burnt feathers and grease comes from Number 3 engine. The student pilot is on an engine stand gingerly poking a finger at the window pane until it begins to give, then he climbs down rather quickly. Most amazing of all is the sight of the neck and head of a large bird hanging limply to the side of the sky anchor assembly where the body impacted.

The crew bus ride back to the squadron is uneventful as usual. The AC asks if anyone has anything special to debrief—no one does. As we get off the bus, he says, almost casually, that everyone did well tonight, all things considered, and thanks. As I leave the life support room and head to the front desk, I pass my long-time "friend" who just grins and shakes his head.

At the front desk, I check the schedule board and see my name up for tomorrow night's training line. Looking over today's schedule, I see "MAINTENANCE CANCEL" penned over our line with the notation "AS USUAL" in big block letters.

On the drive home, I think over the day's events and try to figure out what's still bugging me about this flight. I've been through a lot worse than what happened tonight, but there's something else I just can't pin down. The birdstrike incident was certainly the big event of the flight. The normal three-engine emergency landing was another highlight. The fact I couldn't remember a small detail about the flight safety meeting bothers me a little. Once things settle down on the way home, I realize the entire crew was quite proficient and capable of handling any problem.

So what is causing me to philosophize about the flight? Maybe it's the fact it was just another routine training flight over familiar territory, or perhaps that I didn't pay full attention to routine safety information. Maybe it's the fact everyone settled down into a routine for handling known emergencies and didn't expect anything abnormal once those procedures were accomplished. Maybe it's because once we were down safe and sound, everything was back to normal.

I think a little and begin to say "What if?" What if we had flown a different route and not run into the flock of birds? What if the bird in front of the student pilot had gone on through the window panel? What if Number 4 had been shut down also? What if the normal three-engine emergency landing had not been normal? What if I had paid a little more attention to the facts at the safety meeting?

As I pull into the driveway, I put all these thoughts together and begin to pick out the key words. *"Typical, routine, normal, casual, nothing unusual."* And the *"What if's."* How many times has another flyer gone through the same experience and had pretty much the same thoughts, only to consider them briefly and then go on about business "as usual," since "nothing" happened?

After arriving home, I begin to relax and consider what the other guys would say if I voiced my thoughts during the next debrief or safety meeting? They'd probably listen and make the usual remarks about "it happens," or "guess who just volunteered for safety duty" or they might just sit down and seriously consider the facts.

As I settle down into my favorite chair and take off those ten-pound flight boots, I think I might even have an interesting story for *The MAC Flyer.*

TSgt McClain, an instructor loadmaster with extensive experience in Special Operations, actively participated in Desert One, Iran, 1980, and Grenada in 1983.

Please refer to After Deadlines, page 31.

THE MAC FLYER OFFICIAL READERSHIP SURVEY

(Please circle for questions 1 - 7)

1. ABOUT HOW MANY ISSUES OF "THE MAC FLYER" HAVE YOU SEEN IN THE PAST 12 MONTHS?

0 1 2 3 4 5 6 7 8 9 10 11 12

2. HOW SOON AFTER PUBLICATION COVER MONTH DO YOU USUALLY SEE EACH ISSUE?

Early same month **Middle same month** **Late same month** **Month after** **Even later**

3. WHERE DO YOU USUALLY GET YOUR COPIES OF "THE MAC FLYER?"

Normal distribution **Work Center** **Another person** **Mail** **Other** *(Stolen, etc.)*

4. HOW MUCH DO YOU FEEL "THE FLYER" HAS INCREASED YOUR SAFETY AWARENESS?

A great deal **Some** **A little** **Not much** **Not Any**

5. ABOUT HOW MUCH OF THE MAGAZINE DO YOU USUALLY READ PER ISSUE?

Cover to cover **75%** **50%** **25%** **One or two articles** **None**

6. HOW DO YOU RATE "THE FLYER'S" OVERALL READABILITY?

Super **Interesting** **Not too interesting** **Dull**

7. HOW DO YOU RATE THE MAGAZINE'S OVERALL APPEARANCE COMPARED TO OTHER SIMILAR TYPE PUBLICATIONS?

Bee-u-tiful **Pleasing** **Okay** **Less than Okay** **Really bad**

8. PLEASE RATE THE FOLLOWING FEATURES AND ARTICLES FOR CONTENT AND FREQUENCY

ITEM	CONTENT *(1 = Yuck - 5 = Great)*					FREQUENCY		
	1	2	3	4	5	NEED MORE	OK	NEED MORE
TECHNICAL ARTICLES *(Facts, figures, formulas for flying)*								
MISHAP WITH A MORAL *(Feature stories about major mishaps)*								
FICTION FEATURES *(Selling safety with imagination)*								
CARTOON / TOUCH'N'GO *(Back cover)*								
C R TERROR *(The adventures of MAC's most senior major)*								
BRAD "MAC" MAC KENZIE								
QUICK STOPPERS *(Short mishaps)*								
WRITING CONTEST STORIES								
EXCELLENCE IN AIRMANSHIP *("Atta-crewmembers")*								
GLOBAL NOTES *(Items of interest)*								
AFTER DEADLINES *(Last minute items)*								
OTHER *(You specify)*								

9. MY AIRCREW POSITION IS:

10. TYPE AIRCRAFT QUALIFIED IN:

11. COMMENTS *(Expletives deleted)*

MAC Form 290, FEB 90

UNIMPROVED FIELD OPERATIONS CAN GET STICKY!

Even the best laid plans of mice and men . . .

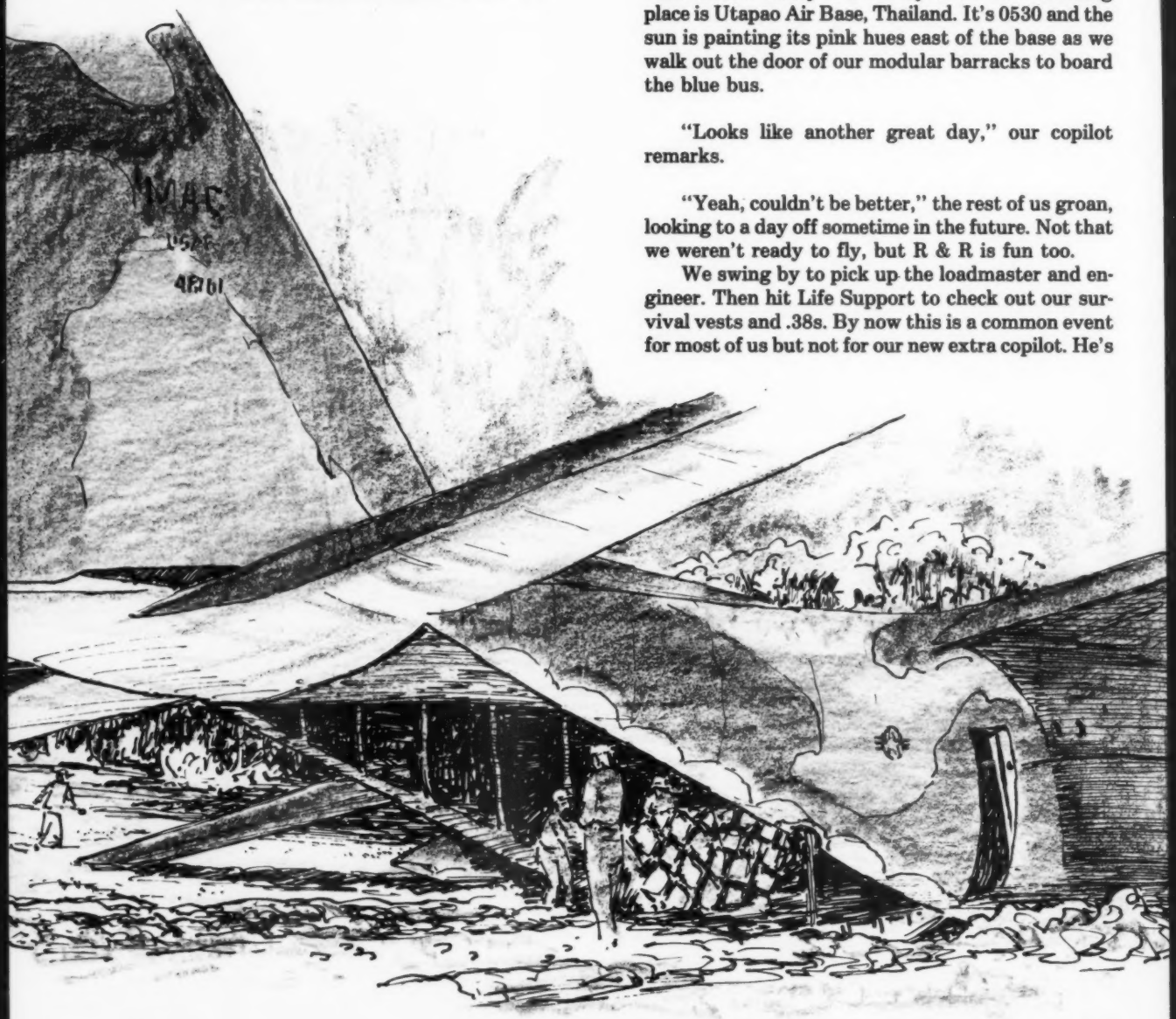
By Maj. Charles L. Morton
435 TAW/DOCP, Rhein-Main AB, GE.

This scene could take place anywhere in the world. Today it's 5 July 1973. The starting place is Utapao Air Base, Thailand. It's 0530 and the sun is painting its pink hues east of the base as we walk out the door of our modular barracks to board the blue bus.

"Looks like another great day," our copilot remarks.

"Yeah, couldn't be better," the rest of us groan, looking to a day off sometime in the future. Not that we weren't ready to fly, but R & R is fun too.

We swing by to pick up the loadmaster and engineer. Then hit Life Support to check out our survival vests and .38s. By now this is a common event for most of us but not for our new extra copilot. He's



still trying to figure out where Utapao AB, Thailand, is!

Hand receipts signed, we head over to our mini command post where we receive a short briefing on the day's mission. This supplements what is on the daily schedule posted in the "O" Club.

"Your cargo load is 44,000 pounds of ammunition on six pallets destined for Kampong Chnang, Cambodia, about 40 miles north of Phnom Penh," the duty officer tells us. "Intel is here to give you an updated briefing on the area. Only one shuttle today, should be a piece of cake," he chortles. You've got 1841 out on the hot spot and it's in good shape."

The engineer and loadmaster quickly depart for the aircraft to start preflight and loading. With 1841, we think we've got a pretty reliable airplane, so we don't expect any big maintenance problems.

"Okay guys," the AC says, "let's go file. Nav, you and the copilots start figuring out how to get to this place, and I'll see what the weatherman has to say. Back at the pool by three o'clock!"

I get the charts out and the airfield is right near the south end of Tonle Sap, the giant inland lake in Cambodia.

"I've heard they have 14-foot ocean-going crocodiles in that thing, so let's stay away from it, Okay?" the copilot says. True or not, I agree wholeheartedly!

"It'll be just like going to good old channel 85 (Phnom Penh) at first," I tell the pilots. "Once we get there, we'll just head east for about an hour or so, pick up the lake, and right in front of us will be Kampong Chnang."

"Looks like there's a fairly good-sized city just east of the runway too," I add, pointing to the chart. "The runway is 5,000 feet long, about 200 feet wide, and gravel. We shouldn't have any problems. The duty officer said we could use the pad at the northwest end to offload. He also mentioned there was another 130 in there last week, so it should be okay."

"Weather's great all over the place. Just the normal afternoon thunderstorms, and we'll be done before they build," the AC quips.

"Well, since the Cambodian Army is supposed to be in control of this place and the territory for 15 miles south, down to Route 25, ground fire shouldn't be too much of a factor," the AC comments. "Just in case, let's spiral down from overhead and take a look at the field. Then we'll come around and land, probably to the north, since the winds are supposed to be light, and most of the jungle is off the north end. No sense in tempting those little buggers hiding in the weeds!"

Our new copilot's eyes widen at the mention of ground fire so I tell him, "Hey, look, we need to talk about these things ahead of time, just in case. Most of the time nothing hapens, and it's pretty boring! We like it boring." But I don't think he believes we expect it to be a quiet day.

"Let's hit the road, guys," says the AC, and we climb into our step van for the ride down to the "Navy Ramp." We '130 guys have been required to operate off this steel-planked ramp just like the P-3 types, so nothing's very handy for us. We've gotten used to that mode. Just like a lot of the slick runways we used in Vietnam, no big deal.

"We're going to be a little heavy this morning," the engineer tells us. "With the 44,000 pounds of ammo and our 31,000 pounds of fuel, we'll be at 155. Just a little extra work for Miss Piggy, right?"

"At least it's cool," the AC responds, indicating the relative coolness of 75 degrees versus the 95-degree temperatures encountered after noon every day.

Takeoff and climbout are as completely uneventful as they can be at 155. We experience no interruptions with things like the infamous whisperjet's prop low oil lights illuminating, or nacelle overheat lights coming on. Our level off altitude of 13,000 feet won't exactly give us a nosebleed, but that's about the best we can do with this bent old airplane. Besides, who needs to go any higher? They probably won't even hear us on the ground. It's a whisperjet isn't it? The strellas (shoulder fired missiles) are down around Phnom Penh. We'll fool 'em today. We won't even give 'em a chance.

"Well, there she is on radar," I tell the pilots, pointing to Lake Tonle Sap, dead ahead. "There on the north end is Angkor Watt, the ancient temple complex. You know, the one all your temple rubbings and soap stone carvings from Phnom Penh imitate? Down there to the right on the scope is where our runway should be. I doubt very seriously if it'll show up on the radar with no buildings around it, but we'll get there. One good thing about only being this high is the descent won't take very long."

"We'll let down to 10,000 feet about five miles out, swing out over the runway, and make our spiral on the east side of the field, toward the city," the AC briefs. "Let's make this a standard max effort, but unless we have any big problems, I'm not going to try to wear the brakes out on rollout."

It looks very quiet on the airport as we make our circuits, so we start down, making our last one tight, turning on about a two-mile final, fairly high. Touchdown is firm, but the surface is surprisingly smooth for gravel and we're down to taxi speed in no time.

"Well, there's the offload pad to the left," I point from the side window behind the AC. "There's even a T-28 and a Pilatus Porter out there. And I can see some old '130 tracks on the ramp area."

"Our new copilot's eyes widen at the mention of ground fire."

"Okay load, let's just combat offload this stuff, stop to pick up our pallets, and leave, if that's alright with you," the AC comments.

"You bet sir, I'm ready," he responds.

"I'll just make a swing around to the left, then back the airplane up, since if we don't, we'll scatter these pallets out onto the runway," the AC says.

The pad appears to be of the same consistency as the runway, with a red gravelly clay appearance, leading all of us to believe its firmness would match the runway. Is all the dirt in Southeast Asia this color? We taxi onto the pad with our tail pointing toward the runway, then make a 180-degree turn, stopping with our nose out on the runway. Now the AC backs the airplane onto the pad until the tail is even with the back edge.

"I'm ready," yells the loadmaster, over the interphone.

"Okay, here we go," the AC says while advancing the power and holding the brakes.

By this time, I'm firmly positioned in the left window, and I notice that we're sinking into the ground; at least the left main gear is! "Release the brakes," I yell at the AC. "We're sinking into the ground!" Unfortunately I'm too late and, even with full power, we're stuck firmly, demonstrating how helpless props are against mud. I look back out, and see that the wingtip is nearly touching the ground, and we still have all four engines running!

The Number 1 prop appears to be about a foot off the ground. If that sucker hits, it's all over and we've really got a serious problem. "Take a look, but I think you'd better shut Number 1 down before we dig the prop in, don't you think?" The AC agrees and shuts them all down, the GTC picking up the load.

We've really made fools of ourselves this time! Not only have we gotten a multimillion dollar airplane loaded with small arms ammunition stuck in a generally unfriendly area, we've done it right in front of the Province Chief, a Cambodian general, Kampong Chnang's Base Commander, a full colonel, and another Cambodian Army general who's waiting for the ammunition. Well, if you're going to do something, really do it big time!

We all crawl off the airplane and survey the damage, which is really quite minor. The left main gear struck a soft spot and just sunk out of sight, while the right main and nose gear were on solid ground. Looks easy enough to fix. Just dig down under the sunken main, shore it up with timbers, and taxi out. So where do we get timbers and tools? We're standing looking right at a complete company of Cambodian soldiers who appear willing to go to work, so we get started.

While the digging and shoring is going on, we decide we really should get the ammo offloaded. I grab a pair of pliers from the engineer and snap all the bands holding the crates to the pallets so we can offload by hand. I then have the loadmaster get the Cambodian trucks backed up, and we get the stuff off the airplane in about 30 minutes.

Now with the airplane lighter, and the gear shored up, it's time to try to move the airplane again. Unfortunately, we can't use Number 1 engine as its prop is just too close to the ground, so our power is limited with 2 and 3 full up, and 4 up part way. The airplane almost comes out, but can't make it over the hump. Back to the drawing boards.

"I guess I'd better call Mother and tell her what's going on over here," the AC says dismally, referring to the dreaded higher headquarters call. "Oh well, what's one more checkride."

"What I think we need is a C-141 nose gear jack. Then we can put it under the wing, raise the wing, and shore the gear to less than its full travel. If we

do it a couple times, we can more or less approach a level taxi out. Should work," I say.

He makes the HF call, adding our suggestions about equipment requirements, and confirms with 7th Air Force that "yes," the airplane isn't going anywhere and "yes," it's definitely a good mortar target. Yes, he thinks if it looks like we might not get it out today, a gunship in the area might help persuade the bad guys not to blow it up. They say they'll work on it.

Meantime, I've struck up a conversation with the base commander, who has his own T-28 he flies on air to ground strikes when necessary. I wonder aloud if he'll fly today, but he says probably not. He should stay around in case we need help. I thank him for that. He also suggests we should feel relatively safe, even though the city is surrounded by 8,000 Khmer Rouge Rebels this very instant. He's confident the army can now protect us with the load of ammo we've just brought in.

The ammo trucks have long ago departed to the south, where we can occasionally hear the sound of mortars and small arms firing. We begin to feel more precarious.

Seventh Air Force now tells us they'll have another '130 in with help this afternoon so just sit tight. How do we sit tight while worrying about our mortar target? Help is still about four hours away, so we continue working to get unstuck, trying to be as productive as we can.

About 1130, the Province Chief, who doesn't speak English, asks us through the Base Commander, Colonel Sok Sombur, if we'd like to come into the Palace and have lunch. The colonel assures us we wouldn't be imposing and the general would feel insulted is we didn't accept. So we head into town in two jeeps with armed escorts front and rear.

The Palace is quite nice, but the rest of the city is boarded up, the ravages of war starting to show everywhere we go in Cambodia these days. We dine on fried rice, boiled chicken, and some other type of meat which is very tasty. Our new copilot has a little trouble, but the rest of us chow down. It's an excellent lunch right down to the mystery meat.

Returning to the airfield, we discover the Pilatus Porter has returned for refueling and rearming. I hadn't noticed before, but a small gatling gun sticks out the left cargo door, making a very menacing appearance indeed.

"Where are you guys going?" I ask the pilot, a captain.

"Oh, back down south about 15 miles to the battle line near Route 25. Want to go? We'll let you fire the gatling gun."

"Man, I'd love to, but if something happened, I might as well hang it up to dry." I didn't for one second consider the fact that I could get wounded or killed, but was really thinking that the crew might get the airplane out and I'd be stuck in Cambodia. How could I ever explain that? To this day, I've regretted that decision, even though I know it was the right one.

They depart and don't return while we're on the ground, but we can occasionally hear the gatling gun firing in the distance.

About 1500, another C-130 lands and disgorges a host of people, carrying all kinds of tools and equipment. They've brought some pallets and shoring, but none of the things we recommended. Apparently, the colonels thought that guys stupid enough to get an airplane stuck couldn't be smart enough to know how to get it out! They brought giant air bags and compressors, designed for recovery of aircraft off runways when the gear is up. Well, I think, maybe it will work. Let's just wait and see.

It's now 1700 and getting darker. The air bags have sprung a leak, the compressors are dying, and the battle now appears lost. We start packing everything up, inform "Mother" of the situation, and leave for Utapao. Somebody will have to come back in the morning and try again.

So, about 18 hours after we left Utapao, we return, this time riding in back. An airplane full of tired, disgusted people feeling defeated by something as simple as a little mud.

No action was taken against us except a few choice words from our Mission Commander.

What could we have done differently? Not believed the duty officer when he said we could probably offload on the pad? Yes. Offloaded on the very side of the runway? Yes, but that may have had soft spots along it as well. We mainly learned that no matter where you go, be careful because operations like ours are fraught with hazards. Our mission was successful in supporting our allies, and we were proud of that. Unfortunately, numerous man-hours were used to get the airplane out of the mud.

Was this the first time a Herk got stuck in the mud? No, it happened many times in Vietnam. Was it to be the last time? No, less than a month later, another crew got stuck in southern Thailand. The recovery went much smoother that time, since the methods were worked out on our airplane. Will it happen again? Probably. As long as you keep taking the old Herky Bird into unimproved places, you stand the chance.

The Last Flight of Tiger 66

Another crew who didn't react to GPWS warnings.

Following the crash of a commercial airliner on approach to Dulles IAP, Virginia, the National Transportation Safety Board recommended installation of Ground Proximity Warning Systems (GPWS) on all air carrier aircraft. The FAA mandated the installation of GPWS would be completed by the end of 1979 for civil operators in the United States.

FLIGHT HISTORY

Flying Tigers Flight 66, a Boeing 747-249F, on a scheduled cargo flight from Singapore to Kuala Lumpur, was airborne at 0604 local on 18 February 1989, with an estimated flying time en route of 33 minutes. The Captain was handling radio communications and the First Officer was flying the airplane. The flight proceeded via a series of routine radar vectors and clearances to a point abeam Pasla intersection where the airplane was handed off from Singapore to Lumpur Control at FL200.

At altitude, the crew discussed the ILS approach to Runway 33 and reviewed the crew briefing while performing the "In-Range" checklist.

Although NOTAMS and the ATIS listed the ILS to Runway 33 as unserviceable, the crew planned for it. After subsequently asking the tower about the ILS and being informed it was not available, they did not brief the issued approach, an NDB to Runway 33.

Tiger 66 was cleared direct to Kayell (KL) Beacon and eventually descended to FL130. The flight was handed off to Kuala Lumpur Tower and, after establishing the flight's position by radial and DME from Batu Arang (VBA) VOR, Tiger 66 was cleared to 7,000 feet and cleared to KL NDB. Several subsequent descent clearances were issued.

0625:10 TOWER: Tiger six six, roger. Cleared to kilo lima, seven thousand, runway three three, QNH of one zero one one, expect no delay, be advised tower visibility all around is about three thousand meters.

TIGER 66: Okay. Is the full runway open, as far as the length of the runway goes?

0625:33 TOWER: Affirmative, full length available.

TIGER 66: Okay, we read a bunch of NOTAMS about holes and ditches and stuff like that. We just wanted to make sure.

0625:39 TOWER: Okay.

0627:00 TOWER: Tiger six six, report your distance now from VBA.

TIGER 66: Tiger six six, you were . . . ah, were you calling six six?

0627:08 TOWER: Affirmative, what is your distance now from victor bravo alpha?

TIGER 66: Okay, fifty miles, fifty DME.

0627:15 TOWER: Tiger six six, descend five five zero zero.

TIGER 66: Five five zero zero, Tiger six six, we're out of seventy-eight hundred.

0628:54 TOWER: Tiger six six, descend three five zero zero.

TIGER 66: Roger, cleared thirty five hundred, we're out of six thousand.

0630:40 TOWER: Tiger six six, descend two seven zero zero.

TIGER 66: Roger, cleared to two thousand seven hundred, we're out of forty-five.

TIGER 66: Tower is your ILS in operation this morning?

0631:10 TOWER: ILS for three three not available, if you wish, ILS one five is available.

TIGER 66: No, that's okay, we'll come on straight in on three three.

0631:51 TOWER: Tiger six six descend (to/two) four zero zero, cleared for the NDB approach runway three three.

TIGER 66: Okay, four zero zero.

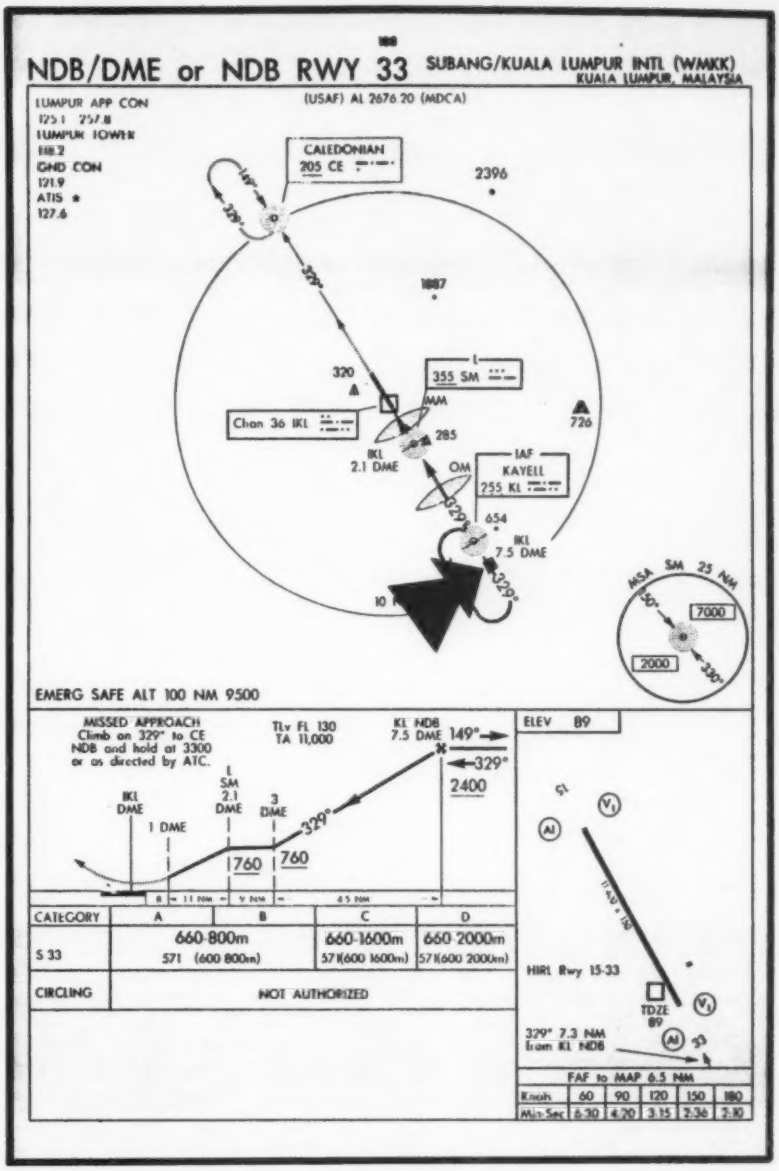
0634:10 Sound of impact.

NOTE: The clearances issued by Tower were consistent in the use of phraseology, and although not standard, were understandable. The last Tower clearance, *to/two* four zero zero, is subject to interpretation. The Tower controller meant "descend two four zero zero" and the crew interpreted it as "descend to four zero zero."

The airplane descended to 437 feet MSL before striking a ridge line one to one and one half miles east of the Kilo Lima Beacon.

The airplane struck numerous tree tops, shedding portions of the leading and trailing edge devices along with portions of the horizontal stabilizer. The airplane continued in controllable flight until the landing gear struck a path halfway up the ridge line. The gear sheared off, and the fuselage pancaked in on the top half of the ridge. The ridge sloped up at an initial angle of 35-40 degrees. The upper half of the ridge had a somewhat lesser angle, but nearly 25-30 degrees of up slope.

As fuel tanks ruptured, leaking fuel ignited and fire consumed the cockpit area. Fire damage to the remainder of the aircraft was minimal; however, impact forces destroyed the airplane. The wreckage came to rest on a heading of approximately 295 degrees, about one mile southeast of KL NDB, and nine miles from the airport.

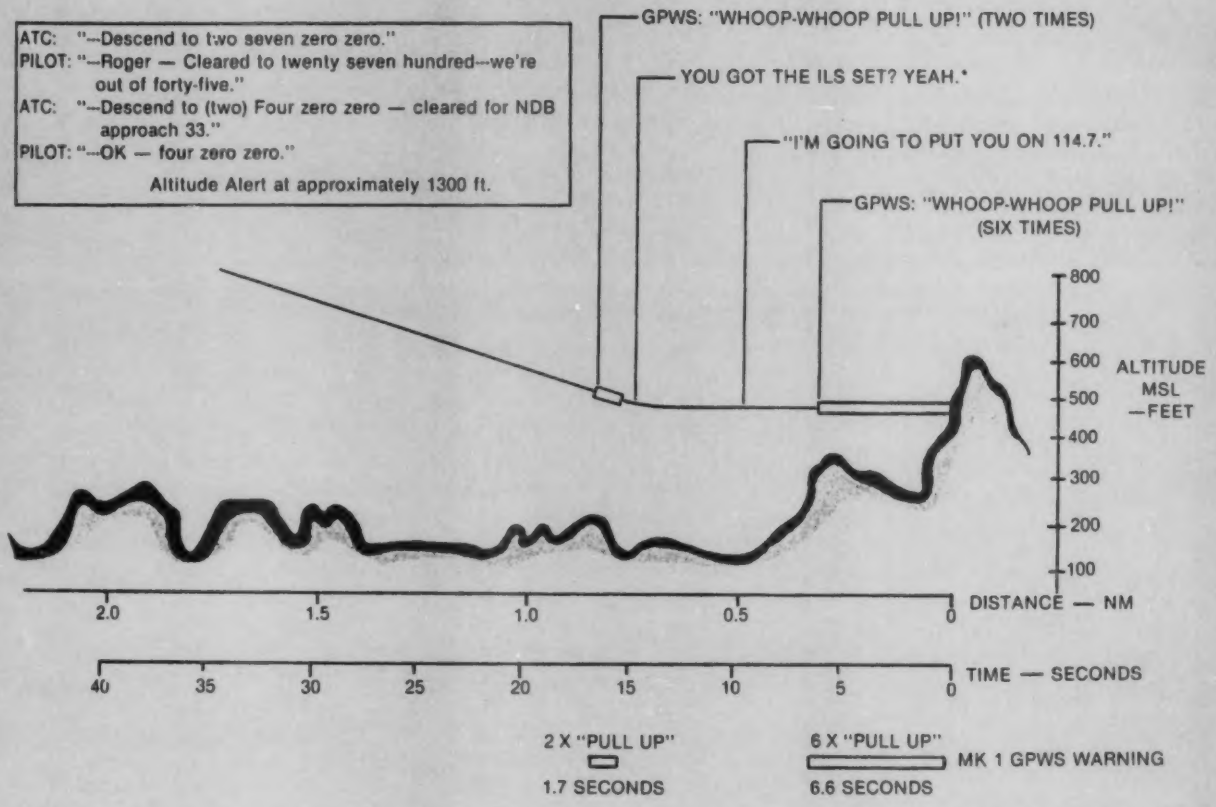


ANALYSIS

There were no open aircraft maintenance write ups that would have affected safety of flight. The Boeing 747 was delivered to the company in 1979 and had a total of 34,034 hours. There were no chronic or repeat items of significance in the aircraft's recent history that could have caused problems on the flight.

This was the first trip of the month for the three crew members. They had not flown together in the previous three months and had not operated into Kuala Lumpur in the past 12 months. The crew was given a Route Check on the first leg of this trip between Los Angeles and

FLIGHT PATH PROFILE
KUALA LUMPUR, MALAYSIA
B747-200
19 FEBRUARY, 1989



*They initially thought they were going to do an ILS.

Honolulu on 9 February. The only discrepancy noted was the failure of the flight deck crew to use headsets below 10,000 feet, as prescribed in the company's flight operations manual.

Forecast weather for arrival included calm winds, visibility restricted to 6,000 meters in mist, four-tenths sky coverage at the surface, eight-tenths sky coverage at 14,000 feet, and a temperature/dew point spread of one degree Celsius. The chief of the Meteorological Department stated it would be typical for mist or fog to build to a height of 400 to 500 feet in the valley. The 14,000-foot deck was thin and the observer could see stars through the mist and upper layer.

At the time of the accident, a NOTAM had been issued for the ILS to Runway 33 at Kuala Lumpur. This NOTAM, one of many for the airport, read: "ILS Runway 33 unserviceable." The investigating team was unable to obtain an exact copy of all NOTAMS issued to the crew. Navigation aids at Kuala Lumpur were flight checked after the accident and found within tolerance. The Malaysian Department of Civil Aviation flight checks all navigation facilities in country. The FAA's offer to use their airplane and equipment were rejected by the local government. The navigation aids are monitored by a system of lights that illuminate when a navigation aid does not radiate a signal within prescribed criteria. There is no audible alarm in the tower cab.

During the investigation, the board discovered that B-767 pilots have reported their flight management system, which takes updates from the VOR (Batu Arang, VBA), offsets the runway one mile when the aircraft is on the runway. Tiger pilots making VOR approaches have also noted this offset to the east.

The quality of recorded air-ground and ground-air communications were satisfactory. The air traffic controller used nonstandard phraseology in the descent clearances issued to Tiger 66. According to Malaysian ATC manuals, altitude clearances should be issued by pronouncing each digit in the number of hundreds or thousands followed by the word hundreds or thousands as appropriate.

Following the above procedure, Tower should have given altitude clearances of:

Two Thousand Seven Hundred

Two Thousand Four Hundred, etc.

Instead the Tower operator issued altitude clearances in the following manner:

Two Seven Zero Zero

Two Four Zero Zero

When Tiger 66 responded "Okay four zero zero," the improper read back of the clearance given (two four zero zero) should have been corrected by the controller. The controller on duty stated that he recently started issuing clearances as described due to the inability of aircrews to understand clearances issued in accordance with handbook procedures. Management pilots of other airlines which routinely transit Kuala Lumpur indicate the controllers have difficulty with the "TH" sound and find it much easier to pronounce each number separately.

An extensive construction program was underway and numerous NOTAMS were in effect at Kuala Lumpur. On the day of the mishap, the ILS Runway 33 was unserviceable and had been NOTAMed as such for some time. All other navigation aids for Runway 33 were operational, as were Runway 15 navigation aids except for the T-VASI. The length and complexity of the NOTAMS list made it even more important to review and analyze the information during preflight preparations. Little time was available to review the NOTAMS during the 33-minute flight.

PROBABLE CAUSE

There was no evidence of engine failure or flight control problems prior to impact. The airplane was controllable until impact. The GPWS activated twice during the final moments of the flight. Seventeen seconds prior to impact, two iterations of "whoop whoop pull-up" sounded. Eight seconds prior to impact, six iterations sounded. There was no response by the flight crew to these warnings. A properly executed escape maneuver would have prevented ground contact.

APPLICATION TO MAC

MAC began installing Mark I GPWS on 89 MAW aircraft in 1975 and, following two controlled flight into terrain mishaps, the C-141 fleet was fitted with the system.

The best defense against inadvertent flight into terrain is for the flight crew to be keenly aware of aircraft position and altitude in relation to surrounding terrain. In those situations where a system breakdown allows an unsafe condition to develop, the GPWS can provide a timely warning.

Activation of the GPWS while in IMC requires immediate, positive action by the flight crew. If corrective action requires a deviation from an ATC clearance, ATC must be advised as soon as possible. Corrective action cannot be delayed.

When operating in visual conditions, time may be available to evaluate the situation but the warning cannot be ignored.

Adapted from
Flying Tigers *Flight Ops.*

322d Airlift Division

Management of MAC's forces in Africa, Europe and the M

By Maj. Stephen E. Behr
Associate Editor

It wasn't typical German winter weather; it was clear and cold—without the fog, haze, or drizzle that normally dominate a northern European winter. *TMF* was in Germany tracking down the challenges faced by MAC units in Europe. After the eight and one-half hour night flight from St. Louis to Frankfurt (reminded me of nights spent in the Starlifter), it was "hit the pavement" and on to the first stop of the visit—Ramstein Air Base, Germany.

The 322d Airlift Division (ALD) at Ramstein directs the military airlift system in Europe, Africa, the Arabian peninsula, and Pakistan. This widespread organization has 12 direct reporting units, located in seven countries, to meet theater airlift mission requirements. The 322 ALD is responsible to MAC through 21 AF, and to European Command (EUCOM) through U.S. Air Forces in Europe (USAFE), for providing an efficient, common-user airlift system for DOD users.

Specific missions of the 322d include: managing and providing logistical support for all MAC-assigned airlift aircraft operating within the theater; exercising operational control over theater-assigned airlift forces in Europe for CINCUSAFE, consisting of logistical, operational support, and aeromedical evacuation aircraft; providing passenger and cargo terminal services at major aerial ports and also airlift control elements at non-U.S. bases.

To accomplish its mission, 322 ALD airlift resources consist of a rotational "Bravo" Squadron of C-130s assigned to the 313th Tactical Airlift Group, RAF Mildenhall, United Kingdom, TDY from MAC CONUS units; C-9s and C-130s assigned to the 435th Tactical Airlift Wing, Rhein-Main AB, Germany; C-23 "Sherpa" aircraft assigned to the 10th Military Airlift Squadron, Zweibrucken AB, Germany; and the 58th Military Airlift Squadron, located at Ramstein, which operates a variety of aircraft including UH-1Ns, C-12s, C-20s, C-21s, a T-43, and a C-135B. The 322d also manages an average of 25 C-141s and five C-5s which transit their area on any given day.

Support for aircraft and cargo is provided by major ports throughout the theater which include the 313th Tactical Airlift Group, RAF Mildenhall, United Kingdom; 608th Military Airlift Group (MAG), Ramstein AB, Germany; 625th Military Airlift Support Group (MASG), Torrejon AB, Spain; and the 628th Military Airlift Support Squadron (MASS), Incirlik AB, Turkey.

Along with its operational function, 322 ALD provides airlift expertise to HQ EUCOM and its component commands as well as MAC detachments at small operating locations. More than 6,500 folks are assigned to the division and subordinate units.

With so many small units dispersed across the theater, the 322d safety staff, headed by

e Middle East

Maj. Gary K. Woodsmall, is busy staying in contact with them. The other folks of 322d Safety are: Capt. Joseph N. Turner, who works both flight safety and nuclear surety issues, occasionally flying C-130s with the 37 TAS; MSgt. Richard K. Scheick who handles the ground and explosives side of the house, and Sgt. Frederica L. Madison-Perry who has administrative duties.

According to Major Woodsmall, there are several areas of challenge for those working in 322 ALD. He began by explaining, "We're all tenant units in 322d, except the 435 TAW at Rhein-Main; most of the safety program is managed by additional duty folks. Once a year, we get them to Ramstein for training. Keeping in contact with the units is perhaps the biggest challenge for us—it can take all day to contact someone at another base, and even then you may not be able to hear each other. To compensate for poor telephone communications, we write a lot of letters and publish a quarterly mishap prevention kit."

Captain Turner explained, "For flight safety, one challenge is the length of time needed to correct hazards. A hazard identified at a foreign base is processed through numerous levels of bureaucracy— theirs and ours. Sometimes we can get things resolved based on good will; we have to be imaginative and innovative in correcting problems. Miscommunication is another problem for crews operating here. Language breakdowns lead to many of the near mid-air collisions investigated here—the most capable controllers are located at the centers, while a local ground controller may just barely speak English. As you go further away from central Europe, communications difficulties become a factor in operating safely. Combining poor communications with poor weather conditions six months a year, and some less than optimum landing aids at some places, makes Europe a demanding environment."

Following the visit with the safety folks, it was a quick walk through the cold to see Col. James H. Davis, then Director of Operations. Colonel Davis began our discussion by stating, "The European theater is the most difficult area in which MAC operates. It's certainly the most complicated area in which to operate with restrictions to airspace and air traffic; extensive requirements for diplomatic clearances; quiet hours along with limited operating hours at some bases. Seasonal weather can have a large impact on flight operations; it's not unusual to have several airfields closed at the same time for low visibility. This makes proper planning by flight crews critical to successful and safe mission accomplishment.

"The 322d supports a lot of exercise traffic both into and through our theater of operations. Our planners are kept busy working flight plans and diplomatic clearances either through or around another nation's airspace as those countries change overflight rules. Planning is also a key element when there are only two bases with 24-hour operations—Rhein-Main and Torrejon. All other bases have some form of quiet hours or restricted operating hours. For MAC crews, this means constrained operations

Maj. Gen. Sistrunk, 322d Commander at the time, now MAC Chief of Staff.

"This is a region that demands discipline."

to meet the limitations at the origin or destination airfields. With all the constraints, the 322d does well with command and control of MAC missions in the theater. The folks who are at the heart of 322d's C2 system in the Airlift Control Center (ALCC), known as 'Phantom,' are the key to our successes."

At the end of the interview, Colonel Davis suggested *TMF* attend a briefing being presented to a visiting admiral and his staff. The briefer was Maj. Gen. William H. Sistrunk, then 322 ALD Commander. At the conclusion of the briefing the general stated, "This is a region that demands discipline."

The commander of the 322d Airlift Division is dual-hatted; he wears a MAC hat as 322 ALD/CC and a second hat as Deputy Chief of Staff for Airlift for USAFE. When asked about challenges, General Sistrunk began, "There are many restrictions ranging from requirements for diplomatic clearance to the air traffic control situation—which is about to be out of control. The density of air traffic here creates the potential for safety problems; dense air traffic is not just a peacetime factor. We're working with local host governments to resolve problems as much as possible. Combine poor weather conditions with occasionally poor ATC radios and heavily accented English, and you've got a real challenge for operators to be safe. Our MAC operations have been exceptionally safe under the circumstances. The complexity of the region demands a lot of discipline; not just the flyers, but the people doing the planning for the flyers—they need to keep safety in mind.

"Crews must be book smart before they get here—this is a very complex system in which to fly. You must know exactly what you should be doing. We are often at the mercy of the air traffic flow control system. There are 22 separate ATC systems in Europe, with a total of 44 different centers; compared to one system and 20 centers back in the States."

The general also explained, "We want to be certain to provide airlift users with the best possible service. When an aircraft breaks in-theater, maintenance folks from one of our units are sent to fix it."

When *TMF* was in Germany, the Berlin wall was opening up and "political change" was the watchword of the day. I asked General Sistrunk how the changes behind the "Iron Curtain" would affect 322 ALD operations. He replied, "We're witnessing a most dramatic change in attitude toward NATO right now. Many local civilians have very mixed feelings about the military, and especially about low level flying. It's important our MAC crews comply with noise abatement rules; we have to maintain our good relations here—even if troops and fighter aircraft are withdrawn from the theater, MAC must still operate here. MAC must maintain the ports in the event there is a need to return forces to Europe."

I knew the weather picture was too good to be true. As I prepared to leave Ramstein and the 322d, the skies became overcast and fog began to fill the local valley. It's this type of weather that makes flying in Europe a challenge. The folks in 322 ALD are meeting that challenge, as reflected in the number of MAC and USAF safety awards they receive each year.

HISTORY

Constituted the 322d Troop Carrier Wing on 4 Dec 1944 and activated at Hollandia, New Guinea, 30 Dec 1944, as part of Far East Air Forces. The unit moved to Manila, Philippine Islands, on 22 Jul 1945 and inactivated 15 Feb 1946. While in the Pacific, unit aircraft included C-46s, C-47s, and various aircraft leased from civil airlines. It was activated again as a reserve unit at Lowry Field, Colo. 12 Jun 1947. The unit was redesignated 322d Air Division, Troop Carrier, on 16 Apr 1948 and inactivated 27 Jun 1949. On 1 Mar 1954, the unit was again redesignated, this time as 322d Air Division (Combat Cargo) and stationed at Wiesbaden, Germany; later the same month, the unit was transferred to Ramstein AB, Germany, and assigned to USAFE. Subordinate units were flying C-119s, C-47s, and C-54 aircraft during this period. One year later, Evreux-Fauville AB, France, became home for the unit, where it remained until 1 Apr 1964 when they moved to Chateauroux AS, France, under Eastern Transport Air Force, which later became 21 AF. During the early 1960s as the division's C-119 squadrons were deactivated, C-124 and C-130 rotational aircraft began to provide theater airlift. In January 1966, "Combat Cargo" was dropped from the unit designation. On 5 Aug 1966, the 322d left France and relocated at High Wycombe AS, England, until inactivation on 24 Dec 1968. The unit returned to Ramstein AB, Germany, on 23 Jun 1978 as the 322d Airlift Division.

Flying-Hour Milestones

15,000

6 MAS
MSgt. George B. Dickson, Jr.

10,000

109 TAG
Lt. Col. Ernest L. Meyer

115 TAS
Lt. Col. David T. Woolsey
MSgt. John Cobb-Adams

315 MAW
Col. Bobby Hammond, Jr.

445 MAW
MSgt. William F. Harrison
MSgt. Lyle L. Starks

913 TAG
Lt. Col. Allen I. Cohen

7,500

ARS
Maj. John A. Cowgill

146 TAW
Lt. Col. Myron Carpenter
Lt. Col. Clyde Doheney
SMSgt. John East
SMSgt. Lawrence Mallory
SMSgt. William Marley
SMSgt. William McCollum

913 TAG
SMSgt. Marvin H. Wagner, Jr.

5,000

9 AES
SMSgt. Colon T. Jones

11 AAS
Lt. Col. Ronald H. Love

15 MAS
Lt. Col. James J. Lawrence
TSgt. Carl L. Geller
TSgt. George H. Porcher
TSgt. Richard A. Stoffel
SSgt. Richard L. Stephens

22 MAS
Maj. Stephen M. Earl
CMSgt. Robert R. Lowdermilk
MSgt. Gordon D. Tomlinson
MSgt. Thomas F. Low

57 MAS
Capt. Robert M. Haley
SMSgt. Howard A. Schmidt
MSgt. Stephen B. Hodge
MSgt. Michael J. Polhemus
TSgt. Sanders J. Pratt

62 TAS
Lt. Col. Tyson T. Travis
Capt. Gary V. Lambert
TSgt. Roscoe A. Robertson

115 TAS
Brig. Gen. Tandy K. Bozeman

146 TAW
Col. Gerald Main
Col. Daniel Pemberton
Lt. Col. John Armstrong
Lt. Col. Jerome Bellen
Lt. Col. John Crocker
Lt. Col. Albert Gardner
Lt. Col. Kraig Kelly
Lt. Col. Loren Steinbrink
Maj. Dale Meyers
Maj. John Thee
Capt. James Mock
CMSgt. George Connor
CMSgt. Robert Onsgard
SMSgt. Robert Beadles
SMSgt. Wrynn Guenther
MSgt. Glenn William
MSgt. Jackson Soffa

463 ALCS
Lt. Col. Jessie B. Usrey
TSgt. James Fekete

730 MAS
CMSgt. Larry L. Sammons

911 TAG
Capt. Laurence Munn

913 TAG
Maj. Louis Amadio
Maj. Peter J. Patalak, Jr.
Maj. Peter D. Brown
TSgt. Otha Perrin, Jr.

1275 TES
Maj. David G. White
MSgt. John H. Jarrett
MSgt. Harold W. Fowler, Jr.

Det 1, 1401 MAS
Lt. Col. John J. Orler

2,500

ARS
Maj. Jerry M. Bergstresser
Maj. Don R. Douglas
Maj. John H. Fitzgerald
TSgt. Lonnie L. Nicholes
Sgt. Gregory M. Vaughn

2 AES
TSgt. Earl D. Unger

6 MAS
SSgt. Mark R. Bergman

9 AES
Sgt. Herman Craighead

15 MAS
Lt. Col. James A. Bayers
Lt. Col. Mark H. Haesecke
Maj. Frank A. Brandeberry
Maj. Michael V. Nelson
Maj. Brian L. Rasmussen
Maj. James T. Rivard
Capt. Donald P. Himebaugh
Capt. Kent M. Lepkowski
Capt. Craig A. Moffatt
Capt. Kenneth F. Recknagel
Capt. Kenneth R. Wavering
TSgt. Troy J. Gibson
TSgt. Ronald A. McWhorter
SSgt. Dana L. Brink
SSgt. Terence A. Giberson
SSgt. Andrew W. Roberts

20 MAS
Capt. Kyle W. Bybee

41 MAS
MSgt. Stephen R. Wierschem

56 MAS
Maj. Gary L. Albaugh
Maj. Randy S. Baareman
Maj. Peter C. Fucci
Maj. Stephen P. Nelson
Maj. John B. Piverotto
TSgt. Robert C. Hummel
TSgt. Paul D. Cohn
SSgt. Lynn S. Gardner

57 AES
TSgt. Bradley W. Davis
SSgt. Allen P. Wiley
Sgt. Debbie L. Thomas

57 MAS
Maj. William R. Park
Capt. Cary G. Davidson
Capt. Ronald U. Muse
Capt. Mondell R. Anderson
Capt. Thimothy W. Baldwin
Capt. Guillermo Berdini
Capt. David J. Britt
Capt. William F. Browning
Capt. David M. Burke
Capt. Michael B. Czarniak
Capt. Grover M. Trask
Capt. Thomas J. Ross
Capt. Gary B. D'Water
CMSgt. Wm H. Wetzel
TSgt. Robert B. Barber
TSgt. Paul S. Collins

Ranks and units are those at time of award.

Playing the Game

Knowing your limits

By Maj. George Nelson
66 ECW/CVI, Sembach AB, GE.

I hate exercises, especially ORIs. This was my third and it seemed the evaluators were being especially sadistic. It was Day Three and my crew had arrived at the squadron just before 0300. Within an hour, the airfield was "attacked" with chemicals by six unknown aircraft and the base went into a four-hour Alarm Black. Somehow, we knew things were going to get worse.

We were tired from the long hours and the pressure. We'd existed almost entirely on MREs and junk food (seldom remembering to drink water). Outprocessing from the squadron in full chemical warfare gear with large plastic bags over our heads, then finding our aircraft broken, was enough to push the joy of flying completely out of our minds. All I could think about was how miserable I was. But this was *the ORI,* and nothing else mattered.

On any other day, I'd have quit right then. I'd heard it a thousand times—don't fly if you don't feel safe or, nothing is worth killing yourself or your crew. I felt miserable, but not unsafe. Besides, my crew was suffering more than I was, and they weren't complaining. Both the copilot and flight engineer had stomach problems. Neither really wanted to fly, but it was *the ORI* and they were determined to do their part.

Maintenance folks fixed the aircraft and things got a little better. The weather had been typical for Europe—bad. But it was improving and seeing the sun again seemed to brighten everyone's spirits. Even the evaluator flying with us seemed happier. This good feeling stopped about 40 minutes later, when weather on the orbit turned out to be worse than predicted. Not only did we not see the sun but, for the next seven hours, we were occupied with avoiding thunderstorms and staying out of ice. On any other day, we would have gone home, gone somewhere else, done anything but stayed where we were. But, like I said, this was *the ORI* and we had to get the mission done.

At the end of our orbit, we tried to join up with a tanker. That went sour too, when the tanker air aborted just as we arrived. We still had enough gas to get home—barely. What's more, the weather

was dropping by the minute. I knew then we should plan on going somewhere else, but this was *the ORI* and we had to get home.

The day had been especially rough on the engineer. The bad weather, lack of rest, and stomach problems had finally caught up with him. He'd been sick twice and was slumped in his seat, breathing oxygen from his mask. We got within 10 minutes of landing and it seemed the worst might be over. Then, the airfield came under another simulated attack. That sent us out to hold for four minutes and sent the engineer to the back of the aircraft again.

The airfield attack simulated destroying a lot of the base, including a fair part of the runway. Tower advised us that, for exercise purposes, we'd have half the runway available and would have to make the first turnoff. I knew it was time to call a halt and do what was safe for the aircraft and the crew. But, since this was *the ORI* and an evaluator was on board, we had to play the game.

As the gear touched down, my mind was not on the landing but consumed with thoughts of processing into the squadron in complete chem gear again. The copilot was occupied with clearing outside the aircraft, and the engineer was just trying not to get sick again. No one saw what was about to happen.

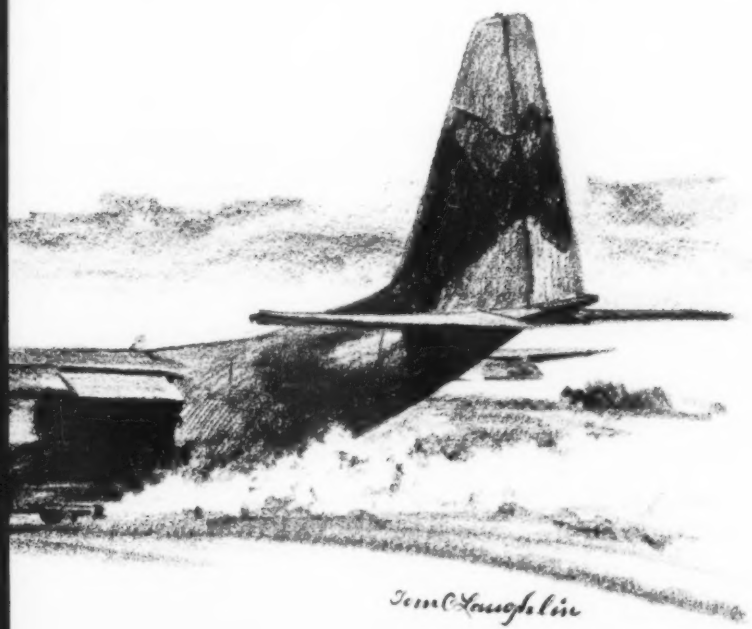
The jerk to the left was sudden and violent. As soon as the gear touched, I jammed all four throttles into reverse. I never gave the engineer a chance to look at the gauges. The Number 2 prop didn't reverse with the others. We departed the runway 500 feet after touchdown at 135 knots. I now had the crew's undivided attention.

I still wasn't sure which engine was the problem, only that it was on the left side. I was sure I had to do something quick because we were heading straight for a small brick building about 1,000 feet in front of us. All four throttles came back to flight idle as I yelled for the copilot to shut down the bad engine. In an attempt to stop the aircraft quickly, I moved the outboard engines into reverse again. While I struggled to control the aircraft, the engineer was in a struggle of his own. Back among the living, he knew immediately what was wrong. He saw the copilot's hand go for the engine condition lever to shut it down and he struggled to grab it, but was too late to keep the copilot from shutting down the Number 3 engine — the *wrong* engine. We came back onto the runway, but only briefly. The aircraft went through a small ditch and up a slight hill. We'd slowed a lot but still had enough speed to collapse the nose gear before coming to a halt.

The crew exited the aircraft and, except for some bruises, no one was hurt. The exercise stopped while maintenance jacked the aircraft and towed it to the hangar. Meanwhile, I braced myself for what lay ahead—an investigation that would make the ORI seem a pleasure. There were a dozen instances when I could have done something to change the day's course of events. But I didn't, because it was *the ORI* and I thought I could ignore the normal rules of safety. I was wrong—almost dead wrong.

Safety rules are there to protect us. Tell your boss, declare crew rest, cancel the mission, do anything, but don't fly when you're not safe. It's not just talk; nothing is so important that it's worth taking needless risks for—not even an ORI.

The rules don't change during an ORI. If you don't feel safe, you have no business in an aircraft. To fly, you have to be 100 percent—mentally and physically. To call it off early may hurt your ego, but trying to hack the mission and failing could get you something worse than a bent airframe and a bad scare.



Courtesy of *Air Scoop* November 1989

MURPHY'S LAW—
lightning strikes two ways

A hair-raising adventure. . .

By Capt. John D. Murphy
5 WW/DNS, Langley AFB, VA

How likely is your aircraft to be damaged by lightning? Considering the current statistics, the odds are certainly in your favor. Are there any precautions or techniques we can use to increase the miss distance? The answer is yes . . . and no.

"A bright flash of light and a loud 'boom' similar to a cannon going off" is how a crew described a discharge they encountered while descending to land. Flying at 10,000 feet, the airplane entered instrument meteorological conditions (IMC) and encountered very light, steady turbulence, seconds before the strike. Immediately after the discharge, the crew noted light rain and St. Elmo's fire (luminous, low intensity electrical discharge). The crew described the St. Elmo's fire as "green waves dancing on the windscreen," which continued for two to three minutes. After landing, maintenance discovered over $50,000 damage, including a small hole in the radome, aircraft skin delamination, and over 100 "spot welds" along the underside of the fuselage. Weather analysis revealed the OAT (outside air temperature) at 10,000 feet was about 1 degree Celcius.

Did this crew do something wrong? The answer is no, since the crew was well over 20 miles from thunderstorms as confirmed by airborne and ground-based radar. Radar showed only light precipitation in the area where they encountered the strike; not the type of weather normally requiring avoidance.

This example is typical of USAF mishaps reported as lightning strikes. Most don't occur while flying near a thunderstorm, *but are associated with flight in precipitation near the freezing level.* An article by D. W. Clifford of McDonnell Aircraft Company, entitled "Another Look at Aircraft-Triggered Lightning," describes the experiences of many military and commercial pilots. Clifford states the strikes usually fit into one of two types. The most common occurs near the freezing level in precipitation not associated with thunderstorms, and may be preceded by static noise on aircraft radios and St. Elmo's fire around the aircraft extremities. When discharge occurs, it's accompanied by a loud bang and usually does little or no apparent damage. Typically, a small $5,000 hole is burned through the radome and minor delamination occurs.

The other type of discharge occurs abruptly in or near a thunderstorm and usually causes more severe damage. This type is what most of us picture as a true lightning strike, where the aircraft was simply in the way of a bolt of lightning. Fortunately, we experience very few of these in MAC—because we routinely give thunderstorms a wide berth.

But what about the more common type of electrical discharge, often referred to as "static discharge" (triboelectric charging for you electrical engineers). It's the one which occurs in areas we normally think of as safe. Clifford explains that aircraft static charge accumulates through a process which is similar to the static electricity build-up when you scuff your feet on a carpet. For aircraft, the amount of charge transferred is related to the type and amount of water particles, aircraft frontal area, and aircraft speed. A C-5 flying at cruise speed through heavy precipitation will usually build up a charge quicker than an F-16 slowed to approach speed flying through light rain. *Flying near the freezing level adds to the static charge build-up.* The most intense electrical charging mechanisms exist in this region due to its mixture of ice crystals and supercooled water droplets. Furthermore, as supercooled droplets become more highly charged at the freezing level, they may break into even more numerous smaller droplets, thus increasing the electric charge build-up.

"The crew described the St. Elmo's fire as green waves dancing on the windscreen, which continued for two to three minutes."

If all this electrical potential is at the freezing level in innocent looking rain clouds, why is there no natural lightning? Good question! Here they deal with theory. First, for lightning to occur, charged areas need to separate. In rain showers, large charged regions don't form until aircraft come flying through. Not only is your aircraft accumulating a large negative charge from impacting cloud droplets and precipitation, the turbulence created in its wake may intensify the charge exchange process. Although Clifford's explanation is complex, it essentially says the aircraft triggers the discharge. Whether you want to call this a lightning strike or static discharge, it really doesn't matter—the results are often the same.

So where does St. Elmo's fire fit into the process? St. Elmo's fire is also called corona and occurs when charge sufficient to exceed the breakdown strength of the air, builds on the sharpest points of the aircraft. Air breakdown strength is its resistance to electrical arcing and decreases with altitude. The corona will typically form around the aircraft nose and besides being visible to the crew, may cause radio static.

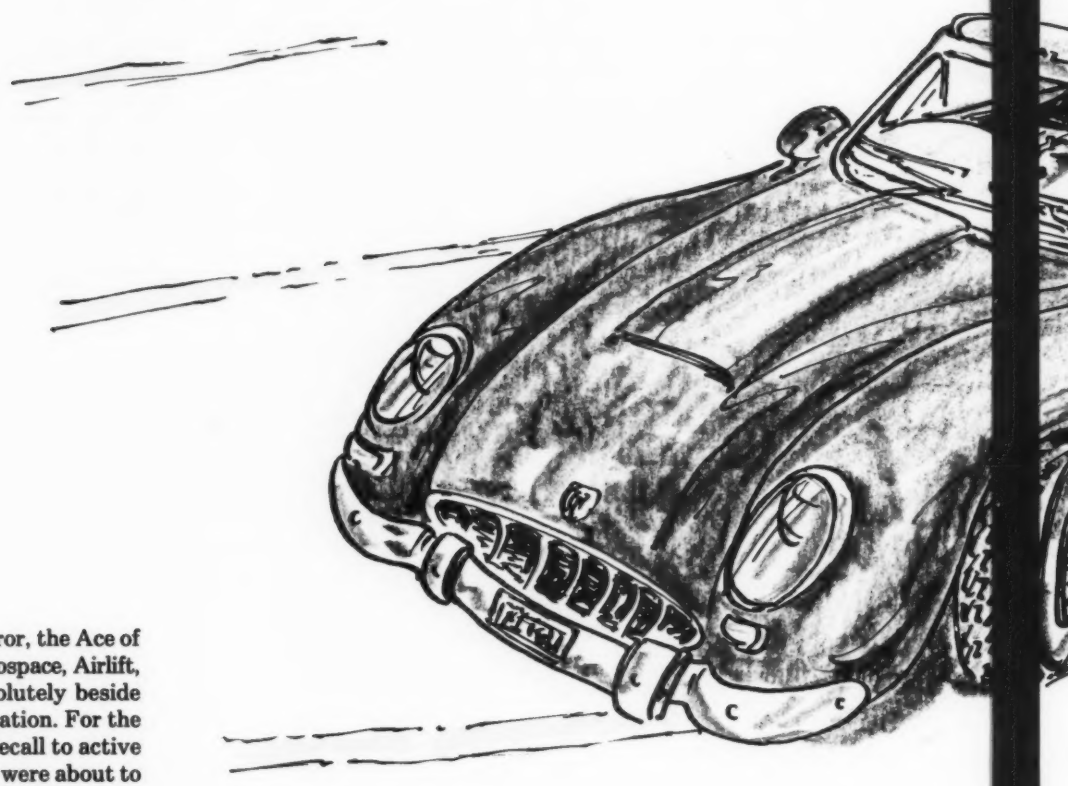
Does the presence of St. Elmo's fire mean you'd better get ready for a strike? Well, not necessarily. Although you may be on the verge of a rapid discharge, electrical exchange to the air by corona reduces the charge on the aircraft. As long as the corona releases charge from the aircraft at least as fast as it builds up, you're okay. However, static charge build-up can exceed the corona's ability to "vent" the charge. The aircraft then becomes a region of charge build-up and a discharge similar to lightning occurs.

This discussion isn't meant to imply we're only susceptible to aircraft-triggered static discharges. Natural lightning strikes can and do occur. The USAF, NASA, and FAA have conducted considerable aircraft lightning strike research by intentionally flying highly instrumented CV-580 and F-106B aircraft in the vicinity of thunderstorms. Their results show conditions likely to cause lightning strikes differ from those we generally encounter during a static discharge. These tests demonstrated the probability of lightning strikes in thunderstorms increased with altitude. At 36,000 to 40,000 feet and at temperatures below 40 degrees Celsius, they averaged two strikes per minute inside thunderstorms. At 18,000 feet, the frequency was one strike every 20 minutes. Most of the strikes were actually triggered by the aircraft itself. Test results, though, were probably influenced by how the data was collected. NASA obtained data by intentionally penetrating thunderstorms—a maneuver most pilots shy away from. Lightning strikes, in the vicinity of thunderstorms, don't pose as great a hazard to MAC aircraft. This isn't because they're not potentially dangerous, but because they're usually easy to avoid by giving thunderstorms a wide berth using flight planning, radar, and good old common sense.

Adapted from *TAC ATTACK* October 1989

C.R. TER

It's great to be early *if* the preflight's complete.



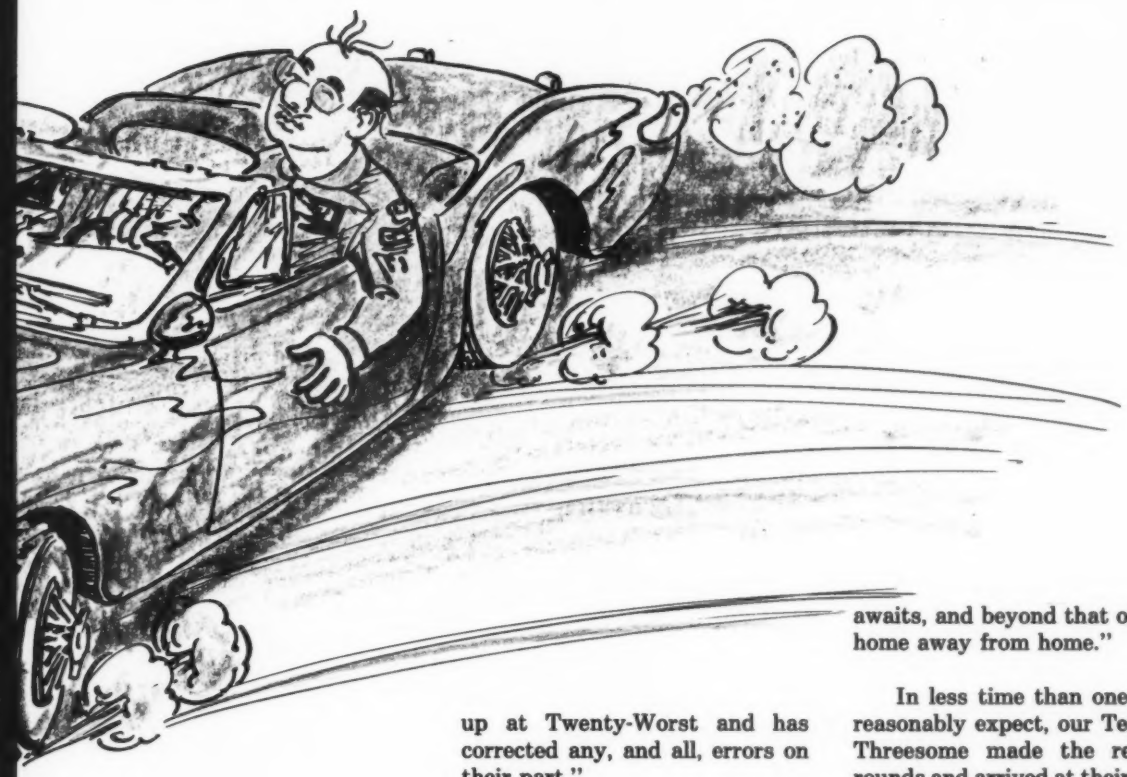
C.R. Terror, the Ace of Aerospace, Airlift, and Alibis was absolutely beside himself with anticipation. For the first time since his recall to active duty, C.R. and crew were about to head off to Jolly Old England on a 72-day Volant Pine rotation.

Our Magic Major pulled into the squadron parking lot in a squealing, four-tire broadslide, as large puffs of blue-grey smoke escaped from the exhaust of his trusty, but aging, E-type Jaguar. After checking his custom-tailored nomex flight suit pockets to insure the presence of his emerald-green pigskin flying gloves, C.R. dashed inside the building feverously searching for his ever faithful crew.

As our hero had hoped, he found Capt. Long Suffering Sam, copilot extraordinaire, and Lt. Blinky Donivan, Wiz Wheel Wizard, in the Nav room putting the finishing touches on today's flight plan. With joy in his voice and a glint of mischief in his squinty little eyes, C.R. greeted his crewmates. "M'lads, time's awasting, I trust you two have handled the details in preparation for today's jaunt. So, if nothing is amiss, let us find our way to the flightline where I'm sure we'll find the rest of our band of able airmen."

"Right again boss," responded Sam. The engineer and load are

ROR



out at the plane. Before we go though, would you like to take a look at the weather sheet and Blinky's computerized flight plan?"

"No need Sammy, the forecast for Lajes has been the same since my fledgling days when I first discovered the pleasures of that little Portuguese Paradise. Your sheet will predict a moderate crosswind and dampness in the air. As far as the computerized flight plan is concerned, I'm sure Blinky has double-checked the product provided by the inmates up at Twenty-Worst and has corrected any, and all, errors on their part."

Blinky responded, "The flight plan looks real good boss, and you hit it right on the button as far as arrival weather is concerned, but the forecasters show quite a few thunderstorms en route. Maybe we should take a look at the northern route."

"Nonsense. I'm sure none of us wish to lengthen the trip by taking an indirect path. If we should have to deviate a time or two, it'll merely give you a chance to, once again, demonstrate your superior navigational skills. Now let's be off, our Atlantic Emerald awaits, and beyond that our new home away from home."

In less time than one would reasonably expect, our Terrorific Threesome made the required rounds and arrived at their C-130. After checking with SSgt. Ty Downs, loadmaster, and insuring the pallet containing the crew's personal gear, especially his hand-tooled baby-blue B-4 bag, was on board, C.R. found his way to the left seat and commenced issuing proclamations.

"Let's be on our way! With a little effort, we can be off on the first minute of our launch window. Let it be known that C.R. Terror is back and is as reliable as romantic success on payday night in downtown Bangkok."

"Pilot, Navigator. Boss, I

need some time to check out the sextant. There's a 781 write-up on it and a history of compass errors. I'd really feel better if we took the time to check it out."

"Tut, tut, my faithful plotter of LOPs. I'm sure we can find our way with the Omega and your superior skills. Sammy, 'Before Starting Engines' checklist, if you please. Loadmaster, stand by for Number 1."

After casting a worried glance back to Blinky, Sammy opened his checklist to the appropriate page, but before he could commence with the first challenge, C.R.'s voice filled his headset, "Hit a switch, turn a dial, getter' running C.R. style, turning Number 1. Sammy, call for taxi clearance, Sergeant Downs, let's button up and be on our way."

"Pilot, Loadmaster. We don't have any marshallers yet, we must be ahead of schedule. Do you want me to stand by?"

"Negative, negative, let's get on with the show, we've got miles to go. All aboard, this train is pulling out!"

After a quick glance around the front of the C-130, Sergeant Downs barely got the crew entrance door closed before the plane started to move. Had Sammy not been busy scribbling down their clearance, he might have noticed the slight jar as the mean green machine taxied over a fire bottle which had been sitting forward of the main gear. No damage to the plane, but the fire-bottle's prognosis was terminal.

Much to the amazement of all who had participated in a rather large squadron gambling pool, based on the assumption that The Bald One would be late, C.R. and crew had managed not only to take off, but had done so in the first minute of their window. Wagers had been placed on estimates of the degree of tardiness achieved. As fate would have it, only one bet had been placed on the possibility of an early takeoff, and that had been placed by a new copilot on behalf of one Tassles Taylor. Tassles, it seems, had met the lad the previous Friday evening at the 'O' Club casual bar.

Shortly after level off, C.R. turned to Sammy and, with a smile that would put a Cheshire cat to shame, announced he had most recently come into an unexpected windfall and would be pleased if the entire crew would be his guest for tonight's meal.

Four hours later and well over the Atlantic, Sammy noticed an unusual amount of fidgeting coming from the recumbent form in the left seat. With a loud snort C.R. sprang to life, and reached deep inside his fight suit pocket to retrieve an unopened pack of gold-ringed Egyptian Oval cigarettes.

"Sammy m'boy, try as I might, I just don't seem to be able to escape the grasp of these little beauties. I thought I had managed to put them behind me after my stint at the health farm, but the body is slow to forget habits learned long ago. Still, the will should be the strongest part of a man so, with a little help from my friends, maybe I can keep this pack sealed forever."

With that, C.R. put the pack back in his pocket and pulled out his ebony cigarette holder which

he, sans cigarette, put between his lips and continued to speak. "The time has come to reveal the true motivation for this trip back to the land of lager and lime. As much as it pains me to say it, retirement time is rapidly approaching my trusted Jaguar, and it is up to us to find a suitable replacement. Hopefully, we will be able to purchase another of these metal thoroughbreds from the stable of some landed British gentry. Our goal is a model with as many cylinders as three yuppie mobiles, and capable of speeds greater than an F-4 on a low-level. This machine will be the nemesis of all the plastic pretenders in America. Detroit has no tradition!"

"Pilot, Navigator. Boss I hate to interrupt but I'm having some trouble back here. I'm worried our compasses may be off. They read within a half degree of each other, but my heading shots put them 5-degrees in error. The problem could be with the sextant mount, or within the sextant, but the only way I know how to check is with a ground shot which I didn't have time to do. We could end up a couple hundred miles off course, and if the navaids at Lajes are all down, and I can't find the islands on radar, we could miss them entirely."

"What? I refuse to be the first American pilot to ditch a C-130," fumed C.R., indignantly. "What does your Omega say? How about our fuel state? Have we reached the point-of-no-return yet? Why couldn't they just have given us an airplane with an INS?"

"The Omega has us left of course which supports compass error," replied Blinky, "as do my cell and pressure fixes. We're using fuel at the expected rate and haven't reached ETP. We can certainly turn around. There's not much chance of us missing North America."

"Blinky, this sounds like a scenario out of MOST (ACT in other than the '130 world), proclaimed The Omnipotent One. Let's talk about it and decide what we want to do. Sammy what do you think?"

"Boss I'd hate to think a relatively small compass error could make us turn around. We don't have any reason to believe the navaids at Lajes are down, our radar appears to be working fine, and we can limit the error by splitting the difference in the two readings. I'm not inclined to turn around."

"Opinion number one. Engineer, your turn."

"Sir, the fuel burn rate is as expected, so we shouldn't have any surprises there. I'm interested in what the nav thinks we should do."

"Not his turn yet. Sergeant Downs, what do you think?"

"Boss, I'm like Sergeant Torque, I'd like to know what the nav thinks."

"Okay, Blinky what's your opinion?"

"Sir, I really think we can find the island. If we split the difference or go with a compass correction we'll be reasonably close to on course. I vote we go with a compass correction, supported by the other navaids, and press on."

"So do I, Blinky m'boy. Sammy, call our friends at Center and let them know we have a small navigational problem and opt to declare minimum navaids. Be sure to request their continued flight following. Engineer, watch the fuel flow. Blinky, do your best. See men, all that time spent at MOST wasn't all wasted like you thought." Wide-eyed stares and shaking heads filled the cockpit.

The remainder of the flight was uneventful. C.R. continued to ramble on over the merits of British autos, Sammy kept close contact with Center, and Blinky was as busy as a Bavarian bar maid at Oktoberfest. No one expressed any concern, but a collective sigh of relief went up when the green image of the islands showed up on radar, quickly followed by a navaid lock-on.

Within seconds of blocking in, Sammy noticed the upright figure of their Squadron Ops Officer, Lt. Col. Pinger, rapidly approaching the airframe. "Boss, Colonel P. is on his way over and based on the expression on his face, I'd say he's not a happy camper.

"Can't be, he must be here to congratulate us on our adherence to the flying schedule, in spite of significant difficulties."

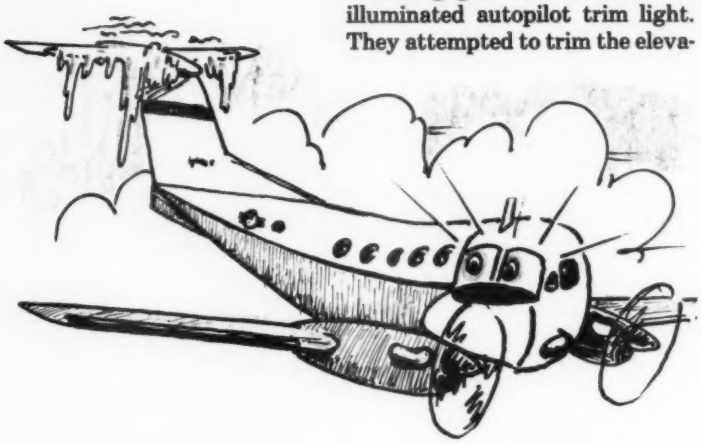
Shortly thereafter, the Colonel and C.R. were in the back of the plane taking part in what appeared to be a one-way conversation.

"Major Terror, were you aware that in your haste to depart, you managed to taxi without proper ground clearance and destroyed a valuable piece of fire-fighting equipment. It also seems there are a lot of unhappy participants in a certain betting pool back home. Colonel Fang has directed I put you on the next C-141 back to the states."

Sammy wondered if this meant that C.R. wouldn't be buying dinner tonight.

QUICKSTOPPERS

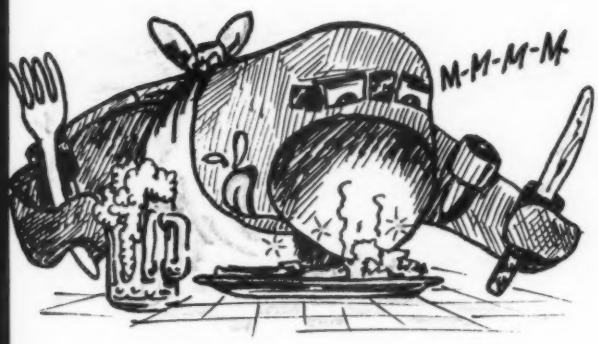
FROZEN WATER PRODUCES FROZEN TRIM



The aircrew of a C-12F was level at FL 330 when the autopilot disengaged. The crew noted the illuminated autopilot trim light. They attempted to trim the elevator with the trim wheel but it would only move approximately one inch, with no effect. When the wheel was released, it would spring back to its original position. A constant speed descent was initiated. Trim worked normal at traffic pattern altitude. Contract maintenance personnel said one of the fittings in the elevator system didn't have enough grease on it to prevent the collection of water. If water were to collect and freeze on this fitting at altitude, it would jam the elevator trim. Technical data does not ensure elevator trim systems are inspected or greased often enough. The recommendation—amend the technical data.

EXPECTATIONS

The crew of another command's RC-135W recently learned a valuable lesson about checklist discipline and verifying what "should" be. It seems the crew, on a local training mission, found the cargo door closed when they arrived at the aircraft—not unusual. When the door is closed, it's *usually* locked. The first hint of trouble should have been when the door's warning light wouldn't go out but only "blinked" when the nav closed the crew door. Focusing on this problem, the aircraft commander decided to fly the local (since the crew door was obviously closed and locked) and get the "electrical problem" fixed when he got home. The pilot *did* direct that the copilot and nav recheck all doors and hatches for security, and was told all were closed and locked (tut, tut). As might be expected, on takeoff, the crew experienced an increase in airflow in the cockpit and, upon rotation, the cargo door swung to the full open position. Normal cleanup procedures were used to 3,000 feet MSL except the speed was kept below 200 KIAS. An in-flight emergency was declared and a successful landing accomplished. Post flight tests on the door warning system indicated it was working properly. Is it complacency? Maybe. Are we professionals? Most assuredly— our lives depend on it.

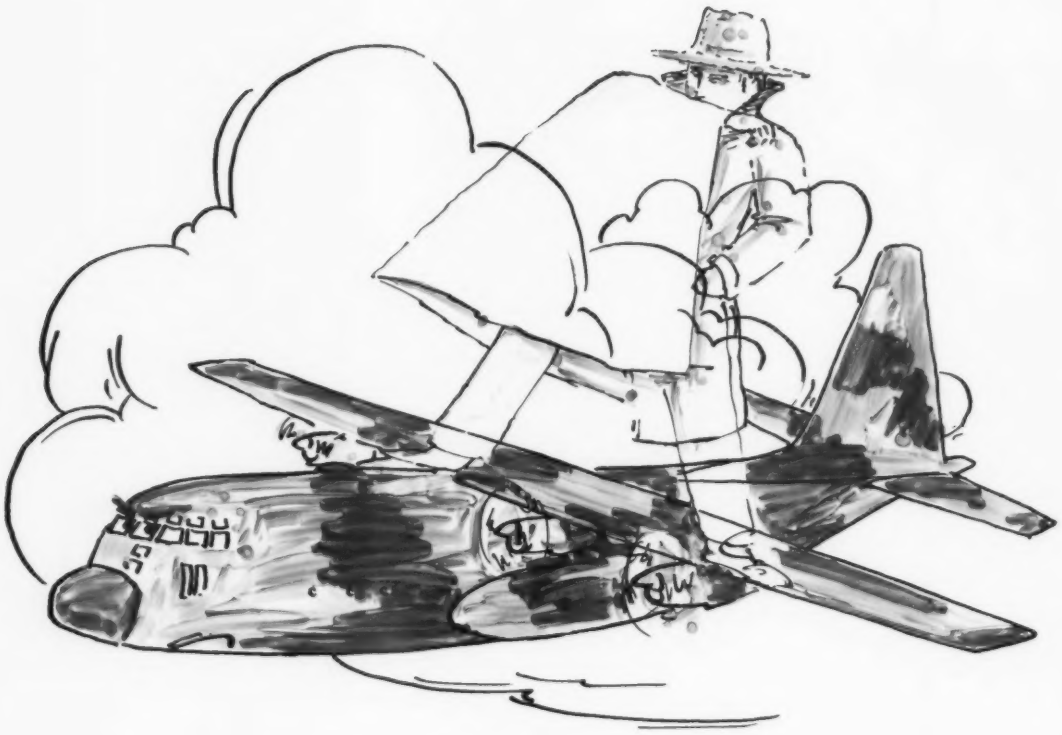


NO SUCH THING AS BAD SCHNITZEL, EH?

A C-5 loadmaster recently found out the hard way that there is such a thing as bad schnitzel. The mission was a European channel returning from Frankfurt, Germany, to Dover, Delaware. Approximately three hours prior to landing, the mishap loadmaster became extremely ill. His symptoms included vomiting, severe stomach cramps, ashen skin, and inability to sit up without feeling faint. Food poisoning was suspected. A phone patch was initiated with the Dover flight surgeon who recommended they continue to destination, where they were met by an ambulance and medical personnel. The loadmaster was transported to the hospital, placed on intravenous fluids, and kept for observation and evaluation. He was released the next day and returned to flight status. The diagnosis was food poisoning, but not from the in-flight meal the loadmaster had consumed 20-30 minutes prior to the onset of symptoms. The flight surgeon ruled out the flight lunch as the source of poisoning for two reasons: time elapsed between consumption and the episode was too short; and two other crewmembers had consumed similar meals with no ill effects. He concluded food poisoning was the result of a meal consumed off base the night before. A memorable meal no doubt, with potentially catastrophic results.

LOST PIECE OF THE PUZZLE

During a left turn to final, the crew of an HC-130 noted aileron binding at approximately 30-40 degrees of left yoke travel. However, the aileron did not lock. The crew decided to perform a precautionary landing and check the ailerons on the ground. During final approach, the aileron bound three more times at approximately the same yoke position. Each time, moderate pressure was able to correct the problem. The crew landed the aircraft uneventfully with 50 percent flaps. The flap setting was not changed after the first binding was experienced. While taxiing to parking, the crew detected a noticeable ratchetting of the yoke when moved through 30-40 percent of left yoke travel. Maintenance later found the left aileron rod end bearing, connected to the boost pack actuator, had failed. The exhibit was lost prior to MDR submission, so without the part, exact cause of failure could not be determined. Too bad. We seem to have a hard enough time making the pieces of the puzzle fit, without losing them altogether.



PHANTOM AT 23,000 FEET

Three hours into the first leg of a three-leg cross-country, the crew of a C-130B felt the autopilot kick off. The autopilot servo control circuit breaker was found to be out and was reset. Upon turning the autopilot on again, the circuit breaker tripped a second time. The remaining hour and one half was flown by hand. One hour into the second leg, while hand-flying the airplane, a "bump" was felt in the ailerons when a right turn was made. This "bump" was described as resistance to aileron movement which was then released as if a cable was momentarily caught on the edge of a flat surface. The occurrence continued intermittently for approximately 15 minutes. At that time, an uncommanded left roll occurred. The roll was stopped when the pilot applied opposite aileron. Pressures for a roll to the left continued, but could be overcome with significant force. Descent was initiated and, passing 14,000 feet, the control pressure stopped. A controllability check was performed at 10,000 feet; descent, approach, and landing were accomplished with no further problems. All control cables, hydraulic fluid levels, and pressures were visually checked after the first indication of trouble, with no abnormalities found. Investigation revealed the aileron servo motor had burned up causing the circuit breakers to pop. Indications of a leak on one side of the aileron boost pack led investigators to conclude the uncommanded turn to the left was a result of this leak. Why all problems ceased passing 14,000 feet is anybody's guess.

After Deadlines

SPEAK UP! We always hear about the need for "feedback." We at *TMF* welcome and encourage reader inputs, and are now giving you a chance to speak up. On page 6 you'll find *The Mac Flyer* Official Readership Survey Form. If you're not part of a group preselected for this survey, cut the page out (or make a copy of it), grab a pen and invest fifteen minutes of your precious time to help **your** safety magazine. Think about the various features we've listed, decide which ones you like or don't like, and which ones you never read (shame on you!). Tell us what you'd like to read more of, less of, and any changes you'd make. Finally, tell us a little bit (not enough to violate the privacy act) about yourself so we know what kind of readers we have. If you need more room for comments just stick on a "Post-it Note." Mail the form to HQ MAC/IGFE, Scott AFB, IL, 62225-5101, by midnight tonight (okay, not later than 1 June 1990).

WE DID IT AGAIN. Many thanks to those who called to point out one small error in our Dec '89, Instrument Quiz. Our answer to question number 9 was "b." The correct answer is "a." The inbound heading of 290-degrees is not within 70-degrees of the holding course. Therefore you turn outbound in the shorter direction to parallel the holding course (AFM 51-37, para. 9-5a).

I'M HERE TO HELP, PART 2. As promised, here are the results of our fictional mishap board. HQ MAC/IGFF found findings Number 1, "the ditch" and finding Number 6, "the pilot failed to. . ." as causal. The vast majority of readers who called in their opinion also found Number 6 as causal, but very few voted for Number 1. Our readers voted at least once for all of the remaining findings with the exception of Number 9. Following Number 6, the findings receiving the most number of votes were Numbers 2 and 3.

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HAIL DAMAGE

MOTHER NATURE'S ANTI-AIRCRAFT WEAPON.